

Remarks:

Reconsideration of the application is requested.

Claims 1-3 remain in the application.

In item 1 on page 2 of the above-identified Office action, the Examiner has noted that no certified copy of the priority application has yet been filed. A certified copy of the priority application will be filed as soon as received by Counsel.

In item 2 on page 3 of the Office action, claims 1-3 have been rejected as being obvious over *Pike, Jr. et al.* (US Patent No. 5,528,058) in view of *Scholz et al.* (US Patent No. 5,357,130) and *Lewis* (US Patent No. 4,881,979) under 35 U.S.C. § 103.

As will be explained below, it is believed that the claims were patentable over the cited art in their original form and the claims have, therefore, not been amended to overcome the references.

Before discussing the prior art in detail, it is believed that a brief review of the invention as claimed, would be helpful.

Claim 1 calls for, inter alia:

an emitter region;

a stop zone in front of the emitter region;

said emitter region and said stop zone having mutually opposite conductivities; and

said stop zone having foreign atoms with at least one energy level within the band gap of the semiconductor and **at least 200 meV** away from **both** a conduction band and a valence band of the semiconductor.

The Examiner cites the secondary reference *Scholz* for teaching "the use of tellurium as a n-type dopant because its ionization energy of about 140 meV is higher than that of 'conventional dopants' ... in order to avoid high levels of deionization." The Examiner then states "[t]herefore, the use of dopants with a high ionization energy ... to enable full ionization was known at the time of the invention." However, in *Scholz* only the substrate is doped with tellurium.

Furthermore, *Scholz* is concerned with a microelectronic device constituted to operate at cryogenic temperatures of less than 40K. In contrast, the power semiconductor element (thyristor) of the present invention is constituted to operate at room temperatures.

Hence, *Scholz* does not disclose or contain a teaching which would suggest to dope a power semiconductor element (thyristor) with tellurium, and, in particular, to dope a stop layer in a power semiconductor element (thyristor) with tellurium.

The secondary reference *Lewis* is applied by the Examiner for teaching that "both selenium and sulfur have long been recognized as suitable dopants in semiconductors". However, *Lewis* neither discloses nor suggests using selenium or sulfur for doping a stop layer in a power semiconductor element (thyristor).

The underlying realization of the present invention is that a stop zone needs to be "active" **only** in the off state but not during its conducting state. In other words, the number of effective doping atoms generated by the disruption in the stop zone should change in dependence on the type of operation of the circuit element. None of the cited references disclose or suggest this underlying realization of having a stop zone which is active only during the off state but not during its conducting state. Without this underlying realization the present invention cannot be obvious because a person skilled in the art would have no motivation for doping a stop layer in a power semiconductor element (thyristor) with foreign atoms with at least one energy level within the band gap of the

semiconductor and at least 200 meV away from both a conduction band and a valence band of the semiconductor. This is the reason the Examiner was unable to cite a reference disclosing such a stop layer as recited in the claims. Therefore, the invention as recited in claim 1 of the instant application is not obvious over *Pike, Jr. et al.* in view of *Scholz et al.* and *Lewis*.

It is accordingly believed to be clear that *Pike, Jr. et al.* in view of *Scholz et al.* and *Lewis* do not suggest the features of claim 1. Claim 1 is, therefore, believed to be patentable over the art and since claims 2-3 are ultimately dependent on claim 1, they are believed to be patentable as well.


In view of the foregoing, reconsideration and allowance of claims 1-3 are solicited.

In the event the Examiner should still find any of the claims to be unpatentable, the Examiner is respectfully requested to telephone counsel so that, if possible, patentable language can be worked out.

Please charge any fees which might be due with respect to Sections 1.16 and 1.17 to the Deposit Account of Lerner and Greenberg, P.A., No. 12-1099.

Respectfully submitted,

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Version with markings to show changes made:

Page 1, lines 7-9, --

This application is a continuation of copending International Application No. PCT/DE99/02082, filed July 5, 1999, which designated the United States and which was not published in the English language.--